

available, which is afforded by the disintegration of the radio-active elements, seems to indicate that devolution occurs primarily along the horizontal series, and that the highest known member of the helium group—the newly-christened niton—takes its place in the chain of descent along with the other elements, and cannot be regarded simply as a by-product.

Enough has been said, however, to indicate the great interest attached to this short work, and the service rendered by the author in presenting in a collected form the ideas of chemists, enriched by his own suggestions, on this fundamental problem of the science.

(2) Dr. Smiles treats of a subject much more amenable to experiment than the disintegration of the elements, and the perusal of his bulky volume shows how difficult it is to arrive at any but empirical relations between physical properties and chemical constitution, even when the effect of every minute change in constitution can be examined experimentally. The work deals with the chief physical properties of the elements and their compounds (with certain exceptions which have already been considered in other volumes of the series), and provides an extremely useful compendium of the work which has been done in this connection. The author has, however, not allowed his subject, great as is the mass of detail comprised in it, to overwhelm him, but has throughout paid special attention to the applications which have been made of the knowledge acquired to the solution of problems of constitution, and to the effect of progress in this branch of the subject on the general trend of chemical theory. The interest is further increased by a preliminary clear account of the nature of each physical property in turn, and a historical sketch of the progress of knowledge with regard to it. The author's final conclusion that further advance will depend essentially on a more complete solution of the problem of valency will probably commend itself to most chemists, and there seems little doubt that, as foreshadowed in many parts of this book, the study of physical properties will be an important factor in the attainment of this result.

In his exposition of the general principles of physical chemistry (3), Dr. Philip has aimed at giving an account of the subject which will be of special value to workers in the borderland regions of biology and chemistry, and has therefore adapted his book both in scope and treatment to attain this end. Without any sacrifice of scientific accuracy, he has given a sound and readable account of the subjects of chief interest to biologists, and has illustrated them wherever possible by reference to problems of a biological nature. In addition to the ordinary fare of works on elementary physical chemistry, special attention is paid to osmosis, permeability and impermeability of membranes, the properties of colloids and adsorption. On the whole, the author has succeeded admirably in his purpose, and has provided a valuable and interesting introduction to the subject, not overburdened with detail and almost free from those mathematical subtleties which are too frequently the despair of biologists.

ARTHUR HARDEN.

#### CHEMISTRY FOR FIRST-YEAR STUDENTS.

(1) *A College Text-book of Chemistry.* By Prof. Ira Remsen. Second edition, revised. Pp. xxiii+702. (London: Macmillan and Co., Ltd., 1908.) Price 10s. net.

(2) *Outlines of Chemistry. A Text-book for College Students.* By Prof. Louis Kahlenberg. Pp. xix+548. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1909.) Price 11s. net.

(1) **T**HE first edition of Prof. Remsen's "College Chemistry" was somewhat unfavourably reviewed in these columns [*NATURE*, vol. lxx., p. 314 (1902)], and, unfortunately, most of the faults then pointed out recur in the present edition. Notable exceptions are, however, the treatment of the ionic hypothesis and of the determination of molecular weights from measurements of osmotic pressure. The least satisfactory portions of the work are those dealing with physical and electro-chemistry. Even on the purely chemical side there are some passages which might be amended. Thus it is not generally true, as stated on p. 144, that metals can be distinguished from non-metals according to whether they do or do not liberate hydrogen from hydrochloric acid to form chlorides. (A better criterion is, however, given on p. 169.) On pp. 185-6 volumetric analyses are calculated on the objectionable system based on a consideration of the weights of the reacting substances in the respective measured volumes, instead of by the straightforward "equivalent" method.

These faults are the more to be regretted since the book is in many ways admirably suited for the purpose for which it is intended. Thus Chapter V., dealing with the atomic theory and the determination of atomic and molecular weights, is, for the most part, a model of clearness. Attempts have been made to bring the work up to date by the insertion of short references to the phase rule, catalysis, the electron theory, radioactivity, &c. Within the scope allowed, the systematic descriptive portion is excellent. The experimental exercises given at the end of each chapter are well chosen; but, unfortunately, few first-year students in this country would have the time or the laboratory facilities for carrying them out.

(2) Prof. Kahlenberg's book is, like the preceding, intended for first-year students, and of necessity covers much the same ground; but there the resemblance ends. The general plan, as set forth in the preface, is to lead up to general theories through the fundamental facts and laws instead of first laying down general propositions and then illustrating these by facts. Accordingly, no mention of the atomic and molecular theories or of chemical nomenclature and symbols is made until the sixth chapter is reached.

Physical chemistry does not occupy a prominent place in the book; nevertheless, seeing that Prof. Kahlenberg is practically the only opponent of the generally accepted ionic hypothesis to be taken seriously, we turn with interest to the pages dealing with this part of the subject. On p. 429 we find the remark: "The main difference between the Clausius and Arrhenius theories is that the latter assumes the

presence of a very much larger percentage of dissociation"; and on p. 432, "The reader will have no difficulty in comprehending books that still use the nomenclature of the theory of electrolytic dissociation by remembering that the term *ion* as used in expressing chemical change means the same as atom or radical" (*sic*).

The periodic law is discussed in Chapter XX., but in the arrangement of the descriptive matter it is entirely ignored. This is a great drawback, as inorganic chemistry without the periodic law and the ionic hypothesis becomes a mere jumble of disconnected facts, difficult to remember, and still more difficult to assimilate. Otherwise the book contains as much pure chemistry as a student of medicine or engineering, who can devote only one year to the subject, requires. There are also short accounts of the chief processes in applied chemistry.

#### OUR BOOK SHELF.

*Super-organic Evolution. Nature and the Social Problem.* By Dr. E. Lluria. With a preface by Dr. D. Santiago Raman y Cajal. Translated by Rachel Challice and D. H. Lambert. Pp. xix+233. (London: Williams and Norgate, 1910.) Price 7s. 6d. net.

"MAN is a product of universal mechanics."

"The solution of the social problem is contained in the law of evolution."

"There exists an irrefragable law which has made man out of a conglomeration of matter, and this same law, sooner or later, will have to be followed, in order that man himself may attain the state of happiness that is his legitimate aspiration."

These aphorisms lie at the root of Dr. Lluria's philosophy. The researches of Don Santiago Raman y Cajal into the phylogeny and ontology of the nervous system have greatly impressed him, and a third of the volume is occupied with an account of them. He assumes that the nervous system of man will continue to increase in complexity. "The brain of man still continues its psychic evolution." While agreeing that this is "a conclusion of paramount value," we fail to trace the logical steps by which it is reached, and the same may be said of the further inference, "In society, super-organic organism, the rapidity of change will be greater than in any other."

With the best will in the world, it is not easy always to follow the author, as, e.g., when he tells us that "Society lives in a profound error as to property. It has chosen the paltry medium of money instead of the grand inheritance of Nature, which belongs to it by right, confirmed by the theory of evolution." But it is not only society that is to blame. "The responsibility falls particularly on many men of science who have not understood the theory of evolution, giving it, for example, such a false and iniquitous interpretation as the *struggle for existence*—a dreadful distortion of the natural course of ideas."

It is unfortunate that the translator is evidently unfamiliar with the technical terminology which is inseparable from a treatise of this description. There is no index.

*The Romance of Modern Astronomy, describing in Simple but Exact Language the Wonders of the Heavens.* By Hector Macpherson, Jun. Pp. 333. (London: Seeley and Co., Limited, 1911.) Price 5s.

COMMENCING with a chapter on our place in the universe, the author proceeds in the established sequence with chapters on the earth's motions, the

sun, Mercury, Venus, &c., completing the discussion of the solar system with comets and shooting-stars. At more remote distances the suns of space, stellar motions and systems, and nebulae are the subjects claiming the writer's pen. Some forty pages are devoted to tides, the spectrum and other incidental subjects, while five chapters deal with popular aspects of astronomical history.

The treatment, though generally clear and accurate, seldom rises above the commonplace. A feature which cannot be commended is the persistent introduction of somewhat lengthy quotations from other writers on astronomy. This method of providing "purple patches" discounts the individuality of the writer, whether it be due to modesty or otherwise.

Though steering clear of error in his elementary exposition, the author is not guiltless of loose statements, such as that silver-on-glass reflectors "have a light-gathering power far exceeding the telescopes whose mirrors are constructed of speculum metal."

Many of the illustrations are new, and, on the whole, well done, the artist being successful in finding picturesque settings for some of the more common astronomical happenings. The frontispiece, however, is very misleading; here an enlarged drawing of the head of Halley's comet fills the picture above a portion of landscape, put in doubtless for effect, the whole giving the impression that the coma stretched from zenith to horizon.

*The Practice of Soft Cheesemaking. A Guide to the Manufacture of Soft Cheese and Preparation of Cheese for Market.* By C. W. Walker-Tisdale and T. R. Robinson. Second edition, revised. Pp. 94. (London: Office of the Dairy World, 1910.) Price 1s. net.

A SECOND edition of this little book having been called for, the authors have taken advantage of the opportunity for introducing a certain amount of new matter. With true commercial instinct, they have put in a section describing fully the preparation of Bulgarian sour milk and sour cheese, but their chief object is to give a number of recipes for making soft cheese—often known as cream cheese—likely to sell well and at a good profit.

Soft cheese is a much simpler matter for the producer than ordinary cheese. No great capital or strength are required; the uniformity desirable for butter-making is not needed, so that comparatively small volumes of milk suffice, and the best demand exists precisely at the time when milk is in greatest abundance, *i.e.* in spring and summer. It is therefore essentially a product that the small holder can go in for, and the recognition of this fact by the authors adds greatly to the value of the book. The process of manufacture is simple, and consists merely in adding rennet to milk or to a mixture of milk and cream, then separating the coagulum, and allowing it to drain. There are, however, numerous details that require attention, but these are fully set out.

The book will be found very useful for dairy students and small holders, as well as for the growing class of dwellers in the country who keep a cow for their own use.

*Twelfth Report of the Woburn Experimental Fruit Farm.* By the Duke of Bedford, K.G., F.R.S., and S. U. Pickering, F.R.S. Pp. iv+51. (London: Amalgamated Press, Ltd., 1910.) Price 1s. 7½d. (post free).

IN this, the twelfth report issued from the Woburn fruit farm, the authors deal with the silver-leaf disease of plums and other fruit-trees in the thorough manner that characterises all their work. This disease is caused by the fungus *Stereum purpureum*, but the